Mathematics CURRICULUM MAP

BIG IDEAS: Mathematics is not about answers, it's about processes. Mathematics is the language of logical problem solving. This is done through students becoming fluent in the fundamentals of mathematics and to be able to reason mathematically. The key elements of the Maths curriculum are Number, Algebra, Geometry, Statistics and Ratio and Proportion. Mathematics helps us to solve problems from finding out the best buy in a supermarket to calculating the amount of paint needed to paint a room to understanding what makes a beautiful face to working out the risks of taking a particular medication. Confidence in numeracy is often mistaken for a confidence in Mathematics and this presents the problem some students find from moving from KS2 to KS3. The more students realise it is a language to break down problems into smaller steps, to find generalisations and patterns in the world and to provide a tool for application in technology, science, geography, music and art to name just a few, the more the students will understand the beauty of the subject. Our curriculum is a spiral curriculum to ensure students meet the skills regularly and build on the challenge every year.

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 7	**Expressions** Understanding concept of algebra and that letters are used to represent unknown quantities **Angles and Measurement** Understanding different units for measurement.	**Arithmetic:** Practising numeracy skills. **Fractions:** Understanding what a fraction is and the link to division.	**Equations and formulae** Developing skills learnt in first topic to finding unknowns **Area and surface area:** Applying skills taught in formulae to finding area of a shape, understanding link between formula and the calculation.	**Fractions, decimals and percentages** Understand the equivalence and how they make calculations easier.	**Probability** Linking experimental and theoretical probabilities **Data Collection** Understanding what is data and how we can analyse it.	**Sequences and graphs:** Looking at patterns in numbers and making generalisations. **3d shapes and volume** Understanding properties of 3d shapes and calculating volume.
Year 8	**Sequences** Linking numeracy skills to algebraic skills **Ratio and Proportion** Solve a variety of problems that involve direct proportion.	**Algebraic Manipulation** Understanding concepts and rules in algebra needed to solve problems later **Equations and formulae** Applying skills from earlier topic to find unknowns	**Area and Volume** Understanding different units and applying the use of formula to measure area and Volume	**Percentages** Calculating proportions of quantities **Angles and shape properties** Understanding measurements of turns. Applying knowledge of skills to understanding properties of shapes	**Linear graphs** Plotting linear relationships on coordinate grids **Data Analysis** Looking at different types of data and different ways to collect it.	**Pythagoras theorem** Applying the use of formulae to shape. Understanding how generalisations are useful in mathematics. **Probability** Understanding concepts of probability and looking at 2 events.
Wider/Super Curriculum	Across all year groups: UKMT Maths Challenges (individual and team), Mayfield maths enrichment day for girls, Maths Olympiad, lunchtime maths enrichment club, opportunities for student Numeracy Ambassadors working in College and at Primary level.					

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 9 Foundation	**Algebra Skills:** Algebraic manipulation Solving equations Rearranging formulae **Number Skills** Estimating calculations Arithmetic Number properties	**Sequences and straight line graphs:** Forming generalisations and rules. Plotting sequences, understand properties of linear graphs **Ratio and Proportion** Understanding fraction, percentage, ratio equivalence, solving problems	**Data Analysis** Calculating summary statistics about data and use it to make conclusions. **Geometry and applied algebraic skills** Linking algebraic skills to solving problems and making generalisations about shape properties.	**Data Representation** Using graphs and charts to display information Understanding when and why different diagrams are used. **Probability** How probability is calculated and relates to everyday life. Using fraction skills to compare probabilities.	**Quadrilaterals and triangles** Trigonometry and Pythagoras Applying skills already studied to multi step problems **Everyday Maths** Applying skills learnt in the year to problems encountered in everyday life.	**Cubes and Cuboids** Applying skills learnt from earlier topics to calculate surface area and volume of cubes and cuboids.
Year 10 Foundation	**Formulae** Understanding the key elements of formulae including substitution and rearranging. **Circles** Revisiting area and perimeter and applying it to circles and multi-step problems involving circles and other shapes.	**Number skills** Arithmetic practice. Index laws including standard form **Sequences and graphs** Building on from linear sequences and graphs in yr. 9 to non-linear sequences and graphs and the properties of these sequences and graphs	**Ratio and Proportion** Generalisations about Ratio and Proportion using algebraic skills. **Data Analysis** Calculating summary statistics about data and use it to make conclusions.Understand why there are different ways to calculate summary statistics. **Fractions and Percentages:** Arithmetic with fractions. Using equivalence to make calculations easier.	**Simultaneous equations** Solving linear equations Understanding link between worded problems and algebra. Recapping linear graphs and how they can be used to solve problems	**3d shapes** Applying skills learnt from earlier topics to calculate surface area and volume of other solids **Geometry skills** Looking at angles and shape properties through transformations.	**Compound measures** Understanding the application of formulae to real life situations. **Speed, distance and time** Applying algebraic skills to study real life Graphs
Year 11 Foundation	**Algebraic Manipulation** Manipulating expressions **Finance** Applying Fraction, Decimal, Ratio and Proportion skills to real life problems.	**Trigonometry and Pythagoras:** Revisiting previous skills but applying them to more complex problems and practical situations **Equations, formulae and inequalities** Applying algebraic skills to solving linear inequalities algebraically and graphically.	**Probability:** Applying the understanding of fractions and decimals to situations involving probability. **Quadratic equations and graphs** Applying the skills learnt earlier in the curriculum to quadratic equations and graphs.	**Data Analysis and Presentation** Using different methods to display and interpret information **Shape skills** Construction, loci and scale drawing.	**Revision and examination**	

		Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Year 9 Higher		**Algebra Skills** Algebraic manipulation Solving equations Rearranging formulae **Number Skills** Estimating calculations Arithmetic Number properties	**Sequences and straight line graphs** Forming generalisations and rules. Plotting sequences and understanding properties of linear graphs **Ratio and Proportion** Understanding fraction, percentage and ratio equivalence. Use it to solve problem	**Data Analysis** Calculating summary statistics about data and use it to make conclusions. **Equations and Formulae** Applying algebraic manipulation skills to constructing and solving equations	**Probability** How probability is calculated and how it relates to everyday life. Using fraction skills to discuss/solve probability problems **Geometry and applied algebraic skills:** Linking algebraic skills to solve problems, make generalisations about shape properties	**Data Representation** Using graphs and charts to display information Understanding when and why different diagrams are used. **Quadrilaterals and triangles** Trigonometry and Pythagoras Applying skills already studied to multi step problems	**Everyday Maths** Applying skills learnt in the year to problems encountered in everyday life. **3d shapes** Applying skills learnt from earlier topics to calculate surface area and volume of 3d shapes.
Year 10 Higher		**Formulae and Algebraic Fractions** Linking skills manipulating algebraic expressions to numerical fractions. Understand how to manipulate more complex algebraic problems **Circles and related shapes:** How to link algebraic skills and mathematical reasoning skills to solving problems involving circles.	**Accuracy and Bounds** Performing complex calculations taking into account the range of answers when values have been rounded. **Data Analysis** Constructing and interpreting statistical diagrams for large continuous data,	**Sequences and Graphs** Making generalisations about patterns and using them to solve problems. Representing patterns graphically and understanding the properties of different types of graphs. **Ratio and Proportion** Extending the Yr. 9 work to look at more relationships between variables and how to conclude what types of proportionality exists between the variables.	**Further Trigonometry** Extending knowledge to solve more complex problems particularly where the triangles do not contain right angles. Observe the graphical representations of trigonometric functions. **Simultaneous equations:** Solving linear and non-linear equations. Understand link between worded problems and algebra.	**2d shapes: transformations, similarity and congruence** Applying geometric skills and mathematical reasoning skills to construct proofs. **Functions and Graphs** Introduction to function notation and how it can be used to make generalisations about variables.	**Compound Measures** Compound measures involve two other measures of different types, (speed and unit pricing are two that students will encounter in everyday life). Further opportunities to apply skills from previous topics. **Vectors and Geometric Proof:** Introduction to vectors, using mathematical reasoning to construct proofs about shapes.
Year 11 Higher		**Algebraic Manipulation** Manipulating expressions **Finance** Applying Fraction, Decimal, Ratio and Proportion skills to real life problems.	**Equations, formulae and inequalities** Applying algebraic skills to solving linear inequalities algebraically and graphically **Further Trigonometry** Extending knowledge of trigonometry to solve more complex problems.	**Real life Graphs** Understanding how to use graphs to show relationships between variables and interpreting the algebra in the context of the problem.	**Probability 2** Extending knowledge of probability to look at more complex problems.	**Revision and examination**	

	Term 1	Term 2	Term 3	Term 4	Term 5	Term 6
Maths Year 12	Algebra and Functions Coordinate Geometry Trigonometry Logs and Exponentials Binomial Theorem		Differentiation (Yr 1) Trigonometry (Yr 2) Integration (Yr 1) Partial Fractions Differentiation (Yr 2) Vectors		Integration (Yr 2) Data Distributions Probability Bivariate data Hypothesis testing Binomial Distribution Normal Distribution	
Maths Year 13 (2019-20)	Partial Fractions Differentiation Trigonometry Integration Parametric functions		Functions Binomial Theorem Numerical Methods 3D Vectors Series Further Kinematics		Revision and examination	
Maths Year 13 (2020-21)	Kinematics Forces Moments Further Kinematics Functions and Graphs Numerical methods		Binomial (Yr 2) Series Vectors		Revision and examination	
Further Maths Year 12	Complex Numbers Matrices Series Proof by Induction Vectors Volume of revolution Roots of polynomials		Trigonometry Calculus Complex Numbers (Yr 2) Series (Yr 2) Further Calculus techniques		Polar Coordinates Hyperbolic Functions Differential Equations Volumes of revolution (Yr 2) Modelling	
Further Maths Year 13	Further Vectors Conics Inequalities t-formulae Taylor Series Advanced Calculus methods Numerical methods for differential equations Reducible differential equations		Number Theory Group Theory Complex number geometry Recurrence relations Matrix algebra Further integration techniques		Revision and examination	